DOCUMENT RESUME

ED 100 482 PS 007 504

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TITLE Facilitation of Young Children's Recall Through the Use of Non-Meaningful Recall Cues.
PUB DATE Aug 74
NOTE 11p.; Paper presented at the Annual Meeting of the American Psychological Association (82nd, New Orleans, Louisiana, Aug. 30-Sept. 3, 1974)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS *Cluster Grouping; Color; *Cues; Experimental Psychology; *Memory; Pictorial Stimuli; *Preschool Children; *Recall (Psychological)

ABSTRACT

This study was designed to investigate recall in preschool children, specifically the cuing technique and possible storage-retrieval differences. Forty-eight 4-years-old were divided into two groups. In the blocked presentation condition, items were presented in category sets of three items, with all items from a single category on cards of one color. In the random presentation condition, cards were also presented in sets blocked on color, but the items on each set were members of different conceptual categories. Results indicated that nonmeaningful recall cues affected young children's typical ways of organizing materials for recall, in ways that either facilitated or were detrimental to the organization and recall of category items. Cues with no meaningful relationship to items cued cannot serve effectively as "reminders" of another category unit, unlike meaningful cues which have been shown in a number of studies to increase the number of categories represented in recall. Nonmeaningful cues can work like meaningful cues with young children in helping them to organize their recalls and, thus, increase the amount recalled from these categories that are assessed. (ED)

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Aug. 23 1974

Facilitation of Young Children's Recall Through the Use of Non-Meaningful Recall Cues *

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A number of studies have shown that recall of category items by adults or children is facilitated when recall is cued using category labels (Moely, 1969; Tulving and Pearlstone, 1966). These findings are taken to indicate a "storage -retrieval discrepancy," in that more information is potentially available to the individual than he reproduces in free recall; with cues, he is able to retrieve additional information that was "stored" but not accessed during the recall process. Recently, Kobasigawa (1974) has found that pictorial cues will facilitate children's recall, using picture cues which bear some meaningful relationship to the set of category items to be recalled. For example, a set of animal names may be cued by presenting the child with a pciture of a "zoo."

A methodological problem in these studies has led other investigators to argue that indeed there is no discrepancy between storage and retrieval, but rather, that the effect of cues is to allow the subject to produce free associations to the category name, which may be scored as correctly recalled items (Cofer, 1967). Moely (1969) attempted to control for this by selecting list items which were related to but not high associates of the cue words, and found a faciliatative effect of cuing among children ages 6-7 years and above.

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* Paper presented at the American Psychological Association Convention, New Orleans, La., 1974.

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Although such a selection of items should minimize the effect of free association, it does not fully eliminate it as a potential contributor to the increase produced by cuing, since most conceptually related words will also bear associative relationships.

The aim of the present study was to extend the cuing technique to an investigation of possible storage-retrieval differences in the recall of preschool children. The problem of free association to the category cue is increased in working with a young age group in which the restricted number of familar categories limits the possiblity of choosing cues that are not associatively related to the category items they represent. An alternative method of cuing was suggested by the notion that preschool children are oriented toward visual-perceptual aspects of their environments, a characteristic that Bruner refers to as "iconic representation" and which Piaget has described as typical of pre-operational thought. It is assumed that when the child sees a picture of an object and hears its name, some characteristics of the visual display are stored along with the name. Comparisons of children's recall following auditory or visual presentations have indicated superior recall when items are presented as pictures, presumably because more information about the item is stored and used in retrieval.

It was suggested, then, that the young child's tendency to be oriented toward the "appearance of things" could serve as a basis for cuing his recall. The procedure adopted was to present items as line drawings on cards of different colors. Each subset of three items contained the same color. Cuing of recall was subsequently carried out by presenting the color name and an example of the color during recall and asking the child to name the appropriate items. This cuing procedure was used with two methods of item

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presentation, which were expected to enhance or impair its effectiveness.

Recall studies have most frequently employed a random method of presentation, in which unrelated items are presented contiquously. This method has been contrasted with blocked presentation, in which items from the same category or associated items are presented in sequence or simultaneously. Recall is usually facilitated by blocking, which is assumed to allow rehearsal of related items, thus strengthening the tendency for such items to form a "unit" which can be read out as such during recall (Moely, 1969; Moely & Shapiro, 1971).

It was expected in the present study that color cuing would facilitate recall by allowing the child to gain access to a category set, rather than by encouraging him to form new units of unrelated items. Thus, color cuing was expected to improve recall when the cue was related to a conceptual category (e.g., all red ones are furniture) but not when the color sets were unrelated to category sets (e.g., red ones are moon, truck, table). Comparisons of cued and free recall following each type of presentation were expected to show 1) facilitation of recall by cuing after blocked presentation; and 2) no facilitation of recall by cuing after random prese tation. Such effects were expected because of the role cuing should play with regard to recall organization: with blocked presentation, cuing should increase category clustering relative to that shown in free recall; with random presentation, cuing by color works against the occurrence of category clustering in recall.

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Method

Subjects. Forty-eight four-year-old children, equally divided by sex, were tested. Six boys and six girls were randomly assigned to each Presentation by Recall subgroup. Children were obtained from three nursery schools for middle to upper-middle class families in the city of New Orleans. Three male experimenters, undergraduates at Tulane University, tested equal numbers of children in each experimental condition.

Materials and Procedure. Each subject was first given a practice trial with three pictures of familiar, unrelated items. All children were able to recall these items perfectly after either one or two presentation-recall trials. The main task was then introduced. Two presentation conditions were used: in blocked presentation, items were presented in category sets of three items, with all items from a single category on cards of one color. Categories were body parts, eating utensils, fruit, furniture, things in the sky, and vehicles. Corresponding colors were white, green, yellow, grey, red and blue. In the random presentation condition, cards were also presented in sets blocked on color, but the items in each set were members of different conceptual categories (e.g., car, knife, and sun were all of the same hue and were presented together). In presentation, the experimenter displayed cards one at a time, asking the child to name each item as it was presented. The first two items in each subset remained within the subject's view until after the third card was presented, after which the experimenter collected all three cards and proceeded to the next presentation trial. The rate of presentation was approximately three seconds per item. Since children were sometimes slow in naming items, total presentation time averaged 69.6 seconds, with no difference

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between presentation or recall groups. If a child was unable to label an item (a rare occurrence), the experimenter supplied the name. After the set of 18 cards had been presented, the experimenter requested recall. Free recalls were obtained from half of the children in each presentation condition, while the remainder were cued with color names. As the experimenter requested a color set, he illustrated the color name by showing the child a blank card of the appropriate hue. Any items recalled were accepted and recorded, whether or not they corresponded to the correct color category. Two additional presentation-recall trials were give. A period of three minutes was allowed for each recall, with cued recall paced at a rate of thirty seconds per category. Order of presentation and recall cuing were counterbalanced across subjects within each sex group and condition.

Results and Discussion

Items recalled. An analysis of variance of the total number of items recalled, including Presentation Method, Recall Method, Sex of Subject, and Trials yielded a significant interaction of Presentation Method with Recall Method, $F(1, 40) = 6.38$, $p < .02$, such that cued recall was superior to free recall under blocked presentation, but produced a strong inverse effect following random presentation. Separate analyses of variance for each presentation condition showed that the facilitation of recall through cuing after blocked presentation was not a significant effect, $F(1, 20) = 1.32$, $p > .20$, with means for cued recall of 10.64 and for free recall, 9.03. The difference between cued and free recall after random presentation was significant, $F(1, 20) = 8.24$, $p < .01$, with a mean 4.75 items recalled with cues and 7.44 items recalled in free recall. An interaction of Presentation Method with Trials, $F(2, 80) = 4.63$, $p < .02$, indicated

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greater improvement over trials with blocked than with random presentation. Significant main effects of PresentationMethod and Trials were qualified by these interactions.

Clustering. Oraanization of recall accordingto conceptual category was scored using the ICI index developed by Robinson (1966), and scores were analyzed in the same fashion as scores for amount recalled. Clustering effects closely mirrored those obtained for recall scores. A significant interaction of Presentation Method by Recall Method, $F(1, 40) = 20.26$, $p < .001$, showed that, as expected, cuing facilitated organization after blocked presentation but had the inverse effect following random presentation. With blocked presentation, cued recall showed an average ICI of .757, compared to a mean ICI for free recall of .520, which was a significant difference according to an analysis of variance of blocked presentation data, $F(1, 20) = 7.18$, $p < .02$. Following random presentation, ICI was much lower for cued ($\bar{X} = .055$) than for free recall ($\bar{X} = .264$), $F(1, 20) = 24.6$, $p < .001$. An interaction of Presentation Method by Trials, $F(2,80) = 14.71$, $p < .001$, was due to an increase in ICI scores over trials after Blocked presentation, with little change over trials when items were presented in random sets. Main effects of Presenation Method and Trials were qualified by these interactions.

Subjects given random presentation could also organize recall on the basis of color groups, rather than conceptual groups. Although cued recall should have forced the child to organize by color, an analysis of color ICI scores indicated that cuing did not increase the amount of color clustering shown. Color-based ICI scores averaged .096 for cued recall and .080 for free recall. These low mean scores indicate that little color clustering occurred.

As an additional difference between the two cued groups, it was noted

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that children who received blocked presentation were more successful at recalling items in response to the correct color cue than were those receiving random presentation (80% and 43% of all items recalled were given in response to the correct color for the blocked and random presentation groups, respectively). In cued recall following random presentation, the subjects showed low color clustering, suggesting that they did not form units of the random item groups, and a low number of items given in response to the appropriate cues, suggesting that they did not remember the color of each item. For blocked presentation, on the other hand, high organization scores suggest that it was easy to cluster items when they were conceptually related; and it was easier to connect a color cue to sets of related items than to random sets.

Category and within-category recall. Studies of cuing have often considered two aspects of recall by separately analyzing the number of categories represented in recall (Rc) and the average number of items recalled from each category represented in recall (Rw/c, or "within category recall"). Tulving and Pearlstone (1966) found that adults are fairly constant in the size of the category units recalled and that cuing affects the number of such category units represented in recall. Moely (1969) and Kobasigawa (1974) found a similar effect for number of categories recalled by children, but also found that cuing improved within-category recall of children up to about eight years of age. Improvement in within-category recall may result from the tendency of category cuing to force the child to cluster items by category. Since category ICI scores aere affected by cuing in the present study, one might expect that within-category recall would be similarly affected. An interaction of Presentation Method by Recall Method, $F(1, 40) = 14.82$, $p < .001$, indicates that this was the case. After blocked presentation, Rw/c scores were higher for cued than for free recall, $F(1, 30) = 4.65$, $p < .05$, with a mean of

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2.59 items per category for cued recall and a mean of 2.16 items per category for free recall. After random presentation, the inverse effect obtained, with cued recall yielding lower Rw/c scores than did free recall, $F(1, 20) = 11.91$, $p < .01$. Within-category recall averaged 1.24 items for cued subjects and 1.80 items for subjects given free recall. Rw/c scores increased over trials, $F(2, 80) = 10.59$, $p < .001$. A main effect of Presentation Method is qualified by the interaction above.

The number of categories represented in recall did not show a significant effect of recall method under either presentation condition. Rc scores increased over trials, $F(2, 80) = 51.67$, $p < .001$, from a mean of 2.85 on the first trial to a mean of 4.56 on the third trial. No other effects were significant. Unlike meaningful cues, color cues did not help the child access new categories. Since there was no intrinsic relationship between the color cue and the category, it is reasonable that this should have been the case. If the possiblity of some conceptual relationship between the cue and items is entirely eliminated, then, cuing does not aid in the recall of additional categories. The effect of cuing is limited to its role in organizing the child's recall. Since subjects were young children whose use of organization is not particularly systematic or extensive, it is reasonable that cuing should affect the order of recall, increasing category clustering and within-category recall in the appropriate conditions.

Finally, it may be argued that the possiblity of a storage-retrieval discrepancy is appropriately evaluated by examination of only first trial data. Up to the time of the first recall, subjects in the cued and feee recall conditions were treated identically, so that any facilitation by cuing on Trial One would reflect a difference between the amount stored and the amount retrieved in

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free recall. Comparisons of free and cued recall on Trial One yielded results very similar to those already presented. With blocked presentation, clustering and within-category recall were improved with cues, indicating that a storage-retrieval discrepancy on the level of items within categories was overcome by requiring the child to organize his recall. This facilitating effect was not great enough to affect the total number ot items recalled, however, and it had no effect on the number of categories represented in recall.

In summary, non-meaningful recall cues affected young children's typical ways of organizing materials for recall, in ways that either facilitated or were detrimental to the organization and recall of category items. This study helps to elaborate the manner in which cuing of categories operates to influence recall. Cues with no meaningful relationship to items cued can not serve effectively as "reminders" of another category unit, unlike meaningful cues which have been shown in a number of studies to increase the number of categories represented in recall. Non-meaningful cues can work like meaningful cues with young children in helping them to orgainize their recalls and thus, increase the amount recalled from these categories that are accessed.

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